M. Packer Inflation Calculation Sheet

Well Name: 700-H Date: 7/28/99

Borehole Size: 4½" Completed By: M. McClure

Open Hole TD: 730'

Open Hole DTW: 258.58 feet /2.3 = 112.4 psi

MP DTW: 249 feet /2.3 = 108.26 psi

Inflation Tool Settings

Packer Valve Pressure (P_V) 165 psi *(low pressure valve ~ 5psi, high pressure valves ~ 140 psi, see packer labels)*

Maximum Packer Pressure (P_{MAX}) 110 psi *(See WJI ENV-0049.A, Attachment D – Maximum Packer Volumes and Pressures.)*

Injection Valve Pressure (P_{INJ}) 180 psi *(calculated by pressuring up tool and reading line pressure after 1 minute, 180 psi optimum, 150-200 OK)*

Hold Back Valve Pressure (P_{HB}) 140 psi *(must be at least 10 psi greater than MP DTW to hold back head in line so that location arm does not open prematurely)*

Tool Pressure (P_T) 320 psi *(measured during surface testing)*

$P_T = P_{INJ}$ when the hold back valve is not in the assembly
$P_T = P_{INJ} + P_{HB}$ when the hold back valve is in the assembly.

$P_{PUMP} - P_T$ = Pressure at which joints are tested.

Test regular couples and pumping ports to 150 psi, measurement ports to 100 psi.

Pump Pressure Calculation (for packer inflation)

Pump Pressure:
$P_{PUMP} = P_{INJ} + P_{HB} + P_V + P_{MAX}$ – borehole DTW + 100
= 180 + 140 + 165 +110 – 112.4 + 100 = 582.6 (585) psi

Logic: P_{INJ} and P_{HB} overcome the tool pressure. P_V provides the pressure required to open the packer valve. P_{MAX} is the pressure required to inflate the packer to its full capacity. The borehole DTW is subtracted because that is the surplus head acting on the tool to inflate the packer which is not balanced by head outside the casing. 100 psi is added to provide a positive flow into the packer.
Note: for packers above the borehole DTW, subtract the packer depth instead of the borehole DTW.

3.2808 feet/meter 0.433 psi/foot